Information Disclosure Statement:

Regarding item 2 of the DETAILED ACTION (page 2 of the OFFICE ACTION SUMMARY): The information disclosure statement ... .

Applicant apologize for missing copies of each of reference in order to consider the references, listed in the applicant's Form PTO-1449 applied to the Patent Application from 06/27/97.

Regarding item 3 of the DETAILED ACTION (page 2 of the OFFICE ACTION SUMMARY): The information disclosure statement ... .

Considering, that Patent Search had been made by Applicant in the beginning of 1997 with no copies of each of references, there is very difficult to present all of them to PTO at this time. Applicant one more time apologize.

Claim Rejections - 35 U.S. C.112 and 35 U.S. C.102(e, b):

Regarding items 4-6, 9-11 of the DETAILED ACTION (pages 3,4 of the OFFICE ACTION SUMMARY):

Item 4 of OFFICE ACTION: Claim 17 is rejected under 35 U.S. C.112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
Item 5 of OFFICE ACTION: Claim 17 recites the limitation "said remote light beam" in line 1. There is insufficient antecedence basis for this limitation in the claim.
Applicant has amended "said remote light beam" to "said remote light beam source" (see amended Claims bellow).
Accordingly, Claim 17 have been amended to recite this distinction and the C.112 (second paragraph) rejection of Claim 17 should be withdrawn.

Item 6 of OFFICE ACTION: Claims 17 recites the limitation "said fiber optics means" in line 2. There is insufficient antecedent basis for this limitation in the claim.
Applicant has amended "said fiber optic means" to "said fiber optic connecting means" (see amended Claims bellow).
Accordingly, Claim 17 have been amended to recite this distinction and the C.112 (second paragraph) rejection of Claim 17 should be withdrawn.

Item 9 of OFFICE ACTION: Claims 6, 16, 17 are rejected under 35 U.S. C.102(e) as being fully anticipated by Chandler et al. (5,731,875) or Schmitz et al. (5,610,712).
Applicant respectfully traverse this rejection.
Applicant has amended the Claims 6, 16, 17 and would like to present a comparative analysis of the referred by Examiner patents with the improved methods and device claimed in the Applicant's Patent Application No. 08/884,680 from 06/27/97. This analysis is proving that

the Applicant's improved methods and device by Claims 6, 16, 17 are not being anticipated by U.S. Patent No. 5,731,875 - Chandler et al. and No. 5,610,712 - Schmitz et al. (please, see the comparative Table 1, attached to this amendment).

Applicant has also made an additional (second) Patent Search, which has not revealed other known Patents and Technical-Scientific publications, which could be adequate to the legal equivalent of Applicant's improved methods and device by Claims 6, 16, 17 of the Applicant's Application No. 08/884,680.

Accordingly, Claims 6, 16, 17 have been amended to recite these distinctions and the C.102 (e) rejection of Claims 6, 16, 17 should be withdrawn.

Item 10 of OFFICE ACTION: Claim 6, 16, 17 are rejected under 35 U.S. C.102(b) as being fully anticipated by Tatsuno et al. (4,595,291).

Applicant respectfully traverse this rejection.

Applicant has amended the Claims 6, 16, 17 and would like to present a comparative analysis of the referred by Examiner patent with the improved methods and device claimed in the Applicant's Patent Application No. 08/884,680 from 06/27/97. This analysis is proving that the Applicant's improved methods and device by Claims 6, 16, 17 are not being anticipated by U.S. Patent No. 4,595,291 - Tatsuno et al. (please, see the comparative Table 2, attached to this amendment).

Applicant has also made an additional (second) Patent Search, which has not revealed other known Patents and Technical-Scientific publications, which could be adequate to the legal equivalent of Applicant's improved methods and device by Claims 6, 16, 17 of the Applicant's Application No. 08/884,680.

Accordingly, Claims 6, 16, 17 have been amended to recite these distinctions and the C.102 (b) rejection of Claims 6, 16, 17 should be withdrawn.

Item 11 of OFFICE ACTION: The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nakamoto et al. (5,325,169) discloses an apparatus for analyzing cells in urine.

Applicant respectfully traverse this rejection.

Applicant has amended the Claims and would like to present a comparative analysis of the referred by Examiner patent with the improved methods and device claimed in the Applicant's Patent Application No. 08/884,680 from 06/27/97. This analysis is proving that the Applicant's improved methods and device are not being anticipated by U.S. Patent No. 5,325,169 - Nakamoto et al. (please, see the comparative Table 3, attached to this amendment).

Applicant has also made an additional (second) Patent Search, which has not revealed other known Patents and Technical-Scientific publications, which could be adequate to the legal equivalent of Applicant's improved methods and device by the Applicant's Application No. 08/884,680.

Accordingly, the Claims have been amended to recite these distinctions and the rejection by item 11 of the Office Action should be withdrawn.

Regarding item 7 of the DETAILED ACTION (page 3 of the OFFICE ACTION SUMMARY): The following is quotation of the appropriate paragraphs of 35 U.S. C.102 that form the basis for the rejection under this section made in this Office Action: ... .

Applicant thanks Examiner for the fragment of 35 U.S. C.102 presented in Office Action.

Regarding item 8 of the DETAILED ACTION (page 3 of the OFFICE ACTION SUMMARY): Claims 1-15 are rejected under 35 U.S. C.102(e) as being anticipated by Staff et al. (5,619, 333).

Applicant agrees with Examiner regarding Claims 2, 3. The Claims 2, 3 are canceled under 35 U.S. C.102 (e).

Regarding Claims 1, 4-15, Applicant respectfully traverse this rejection, has amended Claims 1, 4-15 and would like to present a comparative analysis of the referred by Examiner patent with the improved methods and device claimed in the Applicant's Patent Application No. 08/884,680 from 06/27/97. This analysis is proving that the Applicant's improved methods and device by Claims 1, 4-15 are not being anticipated by U.S. Patent No. 5,619,333 - Staff et al. (please, see the comparative Table 4 attached to this amendment).

Applicant has also made an additional (second) Patent Search, which has not revealed other known Patents and Technical-Scientific publications, which could be adequate to the legal equivalent of Applicant's improved methods and device by Claims 1, 4-15 of the Applicant's Application No. 08/884,680.

Accordingly, Claims 1, 4-15 have been amended to recite these distinctions and the C.102 (e) rejection of Claims 1, 4-15 should be withdrawn.

Attachment: Table 1 - 2 sheets;
Table 2 - 1 sheet;
Table 3 - 1 sheet;
Table 4 - 2 sheets.

Also, considering the substantial significance of the Claims 4, 5, applicant agrees to pay fee for fee-paying amendment and has amended Claims 4, 5 as an independent and two dependent claims, requesting the Examiner's approval. This correction has not changed any ideology, subjects and conceptions, described in the original Application, and has absolutely coresponded to the original drawing Fig.11.

Considering the canceled Claims 2,3 and all amendments recited of the above, please, amend Claims 1, 4-17 to read as follows:

CLAIMS

What is the claimed is:

1. A method for counting and measuring a particles illuminated by a light beam and including the steps, wherein:

detecting said light beam by a light detecting system, including a chamber, inside which a light beam along a light beam axis intersects a particle flow axis in an area of a light detection means, which is placed on said light beam axis, and wherein said intersection of said light beam axis with said particle flow axis is occurred on said light beam axis between a light beam source and said light detection means;

detecting said light beam, which is obstructed by different sizes of said particles of said particle flow, wherein an obstructed light beam has an appropriate intensity and an appropriate duration, determined by an appropriate size of said particles;

detecting the obstructed light beams by said light detection means;

processing a detected signals by a processing system.

2. The method of claim 1, wherein each of said detected signals has said appropriate duration, determined by said appropriate size of said particles.

3. A method for counting and measuring particles, providing a timing processing of at least one or each of a plurality of detected signals, includes the steps of:

conversing said at least one or said each of said plurality of detected signals to a digital form pulse duration, which is determined by an appropriate particle size, thereby forming at least one of a plurality of appropriate duration pulses;

forming at least one of a plurality of strobe pulse packages, strobing said at least one or each of said plurality of appropriate duration pulses by a strobe pulses;

counting a quantity of said strobe pulses within said at least one or each strobe pulse package of said plurality of strobe pulse packages;

selecting and sorting said plurality of strobe pulse packages by an identical quantity of said strobe pulses within each strobe pulse package of said plurality of strobe pulse packages;

counting a quantity of an identical strobe pulse packages.

4. The method of claim 3, wherein said quantity of said strobe pulses within said at least one or said each strobe pulse package contains an information about particle size.

5. The method of claim 3, wherein said quantity of said identical strobe pulse packages contains an information about quantity of the identical size particles.

6. A device for counting and measuring a particles includes:

a light detecting system, including a chamber, a light beam, a particle flow, a tubular particle flow means and a light detection means, wherein an axis of said particle flow intersects an axis of said light beam in an area of said light detection means, which is placed on said light beam axis, and wherein said intersection of said light beam and said particle flow is occurred on said light beam axis between a light beam source and said light beam means;

a processing system, including an analog-digital subsystem connected to a control subsystem.

7. The device of claim 6, wherein said analog-digital subsystem comprises a detected signal conversing and amplifying means connected to said light detection means of said light detecting system and to an analog-digital form pulse duration conversion means, which is through a conjunction means is connected to a strobe pulse generating means.

8. The device of claim 6, wherein said control subsystem comprises a microprocessor subsystem and a terminal means.

9. The device of claim 8, wherein said microprocessor subsystem is connected to said terminal means by a multiplexed bus.

10. The device of claim 8, wherein said terminal means includes at least one of an external interface means, a displaying means, a printing means, a compact disk means, a floppy disk means, which are connected to each other by said multiplexed bus.

11. The device of claim 8, wherein said microprocessor subsystem comprises a selecting, sorting and counting means, which is by said multiplexed bus connected to a conjunction means and to a strobe pulse generating means of an analog-digital subsystem.

12. The device of claim 9, wherein said multiplexed bus is divided on a data bus and an address bus, and a digital data exchange is provided by said data bus and said address bus.

13. A device for counting and measuring particles, including a remote light beam source connected by a fiber optic connecting means to a light detecting system, and wherein said light detecting system is electrically connected to a processing system, comprising an analog-digital subsystem electrically connected to a control subsystem, including a microprocessor subsystem electrically connected to a terminal means.

14. The device of claim 13, wherein said terminal means includes at least one of a displaying means, a printing means, a compact disk means, a floppy disk means, an external interface means electrically connected to each other.

Considering the canceled Claims 2, 3, applicant has also amended Specification, Abstract, Drawings and the Drawing Reference Numerals Worksheet. Additionally, for the eliminating of misunderstanding of the claimed conceptions, applicant has made more narrative description of the claimed improved methods and device instead canceled portion of the text in Specification and Abstract (applicant has not changed any idealogy, subjects and conception, described in the original application). Also applicant has been corrected a printed errors, improper language and grammatical incorrectness, and also applicant has amended BACKGROUND OF INVENTION, considering the referred by Examiner patents.

Specification:

Please, amend the Specification as follows:

Page 1, line 4, change ~by light scattered~ to -- by light or laser beam--;
line 9, delete ~using light scattering~;
line 17, change ~'Active'~ to --Active--.
Page 4, line 8, change ~especially~ to --specially--;
line 15, change ~contained~ to --characterized--.
Page 5, line 3, after ~(Microns).~ insert

--Other known devices use a fiber optic means for scattered or diffracted light collection (see, for example, U.S. Patents No.4,595,291, No. 5,325,169, No.5,619,333 and No.5,731,875).

Some known devices (for example, by U.S. Patent No.5,731,875) use a plurality of light emitting lasers intended for the power decreasing, that provides the eliminating of the laser heat-sink, but, it requires to use a plurality of fiber optic stands and the optical element(s) for the focusing of a plurality of light beams.--

line 7, after ~devices.~ insert

--Also the devices, based on scattered light collection and some other detection methods (for example, by light splitting or by direct detection), use a different variations of the analog comparison method for the particle size measuring. Such method can be illustrated, for example, by U.S. Patent No.4,798,465, wherein is shown the particle size detection device, using one of the particle measuring comparison method variations. The signal from detectors via the amplifiers follow to the comparators, which are connected to the reference voltage means. The amplified detected signals are compared with the predetermined different reference voltages for the particle size qualifying.

The same analog comparison methods we can find in the U.S. Patents No. 5,325,169 and No. 5,619,333.

Such methods cannot provide a sufficiently high sensitivity related to the increasing environmental requirements, because of the non-precise analog method of comparison.--.

Page 6, delete lines 17, 18 in their entirety and insert therefor

-- Fig.7 is a presentation of the structural schematic of an improved device.--;

line 19, change ~diagram` to --schematic--.

Page 7, delete lines 1-7 in their entirety and insert therefor

--Fig.9 is a presentation of the signal timing diagram.

Fig.10 is a presentation of the structural schematic of an improved device with a remote light beam source.--.

line 16, after ~signals~ insert --,-- and after ~means~ insert --,--;

line 17, change ~ processing of the signals~ to --signal processing-- and delete ~ display- ~;

line 18, change ~ing information.~ to --information displaying.-- and change ~amplitude or~ to --direct detection of the particles and--.

Page 8, delete lines 1-7 in their entirety and insert therefor

--By an improved method, the improved timing processing of the detected signals is provided by strobing the digital form pulses created from the appropriate amplified detected signals, having the different durations created by appropriate different size particles, intersecting the light beam.--;

line 13, change ~Figs.6, 7, 8~ to --Fig.6--;

line 16, change ~The~ to --For example, the-- and after ~for~ insert --analyzing of--;

line 17 change ~interrupted~ to --divided (interrupted)--.

Page 9, delete lines 1-17 in their entirety and insert therefor

--On Fig.7 is shown the structural schematic of an improved device, including a light detecting system 11, connected to an analog-digital subsystem 14 of a processing system 27. The analog-digital subsystem 14 is connected to a control subsystem 13 of a processing system 27. The control subsystem 13 includes a microprocessor subsystem 20 and a terminal means 21, which can include at least one of a displaying means, a printing means, a compact disk means, a floppy disk means, an external interface means (not shown).

On Fig.8 is shown the portion of an improved device, which realizes an improved timing processing method of the detected signal. Referring to Fig.8, a light detection means 4 of the light detecting system 11 is connected to a detected signal conversing and amplifying means 15, which can comprise a current-voltage conversion means 19 (if the primer signals from the light detection means 4 are presented in the current value) and an amplifying means 22, connected to each other. The current-voltage conversion means 19 of the analog-digital subsystem 14 is connected to an amplifying means 22, which is connected to a analog-digital pulse duration conversion means 24. The analog-digital pulse duration conversion means 24 is connected to a conjunction means 30, which is connected to a strobe pulse generating means 31 (for example, a controllable oscillator). Also the strobe pulse generating means 31 and the conjunction means 30 are by multiplexed bus 25 connected to a selecting, sorting and counting means 32 of the microprocessor subsystem 20 of the control system 13.

Fig.9 presents a timing diagram of the signal processing. On this figure τ_i represents a duration of the pulses, where $i = 1, 2, 3, \ldots$.

Fig.10 is presented a structure of an improved device with a remote light beam source. A remote light beam source 28, connected by a fiber optic connecting means 29 to a light detecting system 11, which is connected to a processing system 27, including an analog-digital subsystem 14 connected by a multiplexed bus 25 to a microprocessor subsystem 20 and a terminal means 21 of a control subsystem 13. --.

Page 10, line 1, change ~Figs.6, 7.~ to --Fig.6.-- ;

line 3, change ~obstructs the light~ to --is an obstruction for light in the direction--;

line 4, after ~4.~ insert

--For other detecting principles (for example, for scattered light collection by lens or mirror collecting system), the light intensity on the light detection means (on the light detector) will be presented when the particles obstruct the laser beam and the bigger particles, the higher intensity.--;

delete lines 5-19 in their entirety and insert therefor

--The signals detected by the light detection means 4, (see Fig.8) follow to the current-voltage conversion means 19 of the analog-digital subsystem 14 of a processing system 27.

The detected signals can be described by an equation $I = f_1 (E, F_1)$, where: I - an output current of the light detection means 4 (if the primer signals from the light detection means 4 are the current value signals); $E = f_2 (P, D, F_2)$ - a light intensity of the light beam on the light detection means 4; P - an unobstructed light beam power, D - a particle dimensions (sizes), F_2 - the other factors (for example, a particle reflectiveness, a particle permeability, etc.); F_1 - a physical-technical parameters of the light detection means 4.

The signals from the light detection means 4 follow, as was mentioned above, to the current-voltage conversion means 19, where they are conversed to the voltage value signals, as shown on Fig.9a (for other detecting principles, for example, for scattered light detecting principles, the signals can have a positive polarity), and after the amplifying (Fig.9b) by an amplifying means 22 they follow to the analog-digital pulse duration conversion means 24. The analog-digital pulse duration conversion means 24 provides two major operations: converses the analog form pulses to the digital form pulses and converses the duration of analog pulses to the adequate duration of digital pulses.

From the analog-digital pulse duration conversion means 24 the signals (Fig.9c) follow to the conjunction means 30, in which also follow strobe pulses (Fig.9d) from the strobe pulse generating means 31. The signals (Fig.9e) from the conjunction means 31, having the strobe pulse pack-ages configuration, follow to the selecting, sorting and counting means 32 of the microprocessor subsystem 20 of the control system 13.

The selecting, sorting and counting means 32 provides selection and sorting of the identical strobe pulse packages (packages within same strobe pulse quantity, that means - with the same strobe pulse package duration τ_i , where i = 1, 2, 3, ...) and also provides the counting of the identical strobe pulse packages, determining a particle quantity, and the counting of the strobe pulse quantity in the mentioned packages, determining a particle size. The processed signals (packages, see Fig.9e) have the different durations τ_i . These durations are related to the different sizes of the particles, which create the different obstructions for the light beam. The durations τ_i , characterize the particle sizes. The longer strobe pulse package (the bigger value of τ_i), the bigger particle size. The higher frequency of the strobe pulses, the higher precision and sensitivity of an improved device: --.

Page 11, delete lines 1-9;

delete lines 1,2 of the bottom in their entirety and insert therefor

--Also the microprocessor subsystem 20 processes, for example, the signals, containing the information, for example, about environmental temperature, humidity, velocity rate, etc.

The microprocessor subsystem 20 is also connected by the multiplexed bus 25 to a terminal means 21, which can include a display means, a printing means, a compact disk means, a floppy disk means and an external interface means (all of them not shown). The control subsystem 13 also includes the self-diagnostic and calibration means (not shown), connected to an analog-digital subsystem 14 and by multiplexed bus 25 to the microprocessor subsystem 20.

Referring to Fig.10, the light beam or laser beam is transferred from a remote light beam source (or remote laser beam source) 28 to the chamber 12 (see on Fig.6) of a light detecting system 11 by a fiber optic connecting means 29.--.

Page 12, delete line 1-4 in their entirety;
line 9, change ~of air~ to --of air, gas--;
line 11, change ~an improved~ to --of improved--;
line 17, change ~for improved amplitude~ to --for an improved timing.

Page 13, delete lines 1,2 in their entirety;
line 3, change ~unfocused~ to --non-focused--;
line 6, after ~detector~ insert --and can not require a power light beam, as it is necessary for the scattered light detecting system--.

Abstract:

Please, cancel the originally filed Abstract of the Disclosure and accept the substitute Abstract of the Disclosure, attached hereto on a separate piece of paper.

Attachment: 1. Abstract - 1 sheet.